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WASTE LAND AND WASTED LAND ON FARMS.

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On the average American farm there are certain waste areas of land. Some of these can be brought under the plow by using proper methods and a sufficient outlay of capital, but others can not be made tillable by any reasonable expenditure of effort or money. Of the latter, certain areas may be made productive by pasturing or giving them over to the production of timber. Many waste areas, however, owing to natural conditions, can never be profitably reclaimed, no matter how efficiently the land may be managed.

Certain other areas, found on almost all farms, may be termed wasted areas. That is, they are misused in such fashion that they produce nothing that adds to the farm income. These two classes of waste and wasted land, not being productive of income, may be classed as nonproductive farm land.

An important question to one who is considering leasing or buying a farm, is, what proportion of the land is nonproductive? And this question is almost equally important to the man who owns or operates a farm. In the latter case the question might better take this form: What per cent of my land is adding nothing to my income? On farms where land is cheap this is not a vital consideration, as the interest on the capital invested in the nonproductive portion of the farm land is not great; but as lands become higher in price it becomes more necessary to study efficiency in the use of farm land in order to avoid the loss entailed by having much capital invested in non-productive land.

EFFICIENCY IN UTILIZATION OF LAND.

Investigations made by the Office of Farm Management,¹ as well as those made by certain State experiment stations,² have developed the fact that of the three more important elements of successful farming, the first and most important is the size of the business. A recognized authority on successful farm management³ has written: "The area in crops and the natural yielding power of the soil are the most important factors in determining profits on farms."

Efficient utilization of farm land means a high percentage of productive area, thus increasing the income-producing part of the farm to the utmost. It logically follows that an important factor in determining the fair acre value of a farm is the answer to the question: What proportion of the total area can be made productive? This point of view is of great significance in studying the respective economic values of different farms. For instance, compare a farm of 100 acres at \$200 per acre, having 95 acres in shape to yield available products, with another of the same acreage at \$150 per acre, having 65 acres productive. All other features of these two farms being similar, the former should prove more profitable, as the productive land thereon costs but \$210 per acre as against \$230 per acre on the "cheaper" farm. Table I shows the cost per acre of the productive land on 100-acre farms costing \$100 per acre, with various percentages of the land available for productive purposes. It is not always the farm that costs the least per acre that is the most economical to buy or operate.

Reclamation of nonproductive land, in so far as it is possible and profitable, is a very important point of farm economy. The resultant increase in value is due not only to increased productiveness, but also to improvement in the appearance of the place. The latter factor is often of sufficient importance fully to warrant the expenditure of time and money in clearing up the waste places and making them productive, in so far as is economically possible.

TABLE I.—*Relation between percentage of land available for production and cost per acre.*
(Value of land, \$100 per acre.)

Percentage of land available for production.	Cost per acre of available land.	Percentage of land available for production.	Cost per acre of available land.
100.....	\$100. 00	50.....	\$200. 00
90.....	111. 11	40.....	250. 00
80.....	125. 00	30.....	333. 33
70.....	142. 86	20.....	500. 00
60.....	166. 67	10.....	1,000. 00

¹ See U. S. Dept. Agr. Bulletins 41 and 117, by E. H. Thomson and H. M. Dixon, entitled, respectively, "A Farm Management Survey of Three Representative Areas in Indiana, Illinois, and Iowa," and "Profits in Farming on Irrigated Areas in Utah Lake Valley."

² See Cornell Experiment Station, N. Y., Bulletins 295 and 349, entitled, respectively, "An Agricultural Survey," by G. F. Warren and K. C. Livermore, and "Some Important Factors for Success in General Farming and in Dairy Farming," by G. F. Warren.

³ Warren, G. H., "Farm Management," p. 518.

PRODUCTIVE AND NONPRODUCTIVE LAND.

Broadly speaking, productive farm land is that used for:

The production of crops.

The economic pasturing of animals.

Woodland yielding marketable timber or firewood, maple sugar, or other salable forest products.

Nonproductive farm areas may be roughly classified as follows:

Wasted..	Land unnecessarily taken up by farm buildings and lots.
	Land taken up by unnecessary lanes and roads.
	The part of any public road included in a farm area.
Waste...	Land occupied unnecessarily by fence rows, open ditches, headlands, or turning spaces bordering fields and terraces.
	Land rendered untillable by swamps, rocks, large rocks, and ledges, ravines, steep slopes, sloughs, streams, etc.
	Woodland not yielding salable products.
	Uneconomic pasture land.

While, literally speaking, all land necessarily occupied by farm buildings, fences, etc., is nonproductive, such occupation is necessary to the development of the productivity of the rest of the farm; hence, for the practical purposes of this discussion, "nonproductive land" will be taken to mean only such land as is either left untilled by inefficient management or is not susceptible of profitable improvement. The total amount of land taken out of the farm total by these nonproductive areas is in many cases a large proportion of the whole. Such waste or wasted areas should be carefully considered by the prospective buyer of a farm.

Table II shows the average percentages of improved land on farms in the States and divisions of the United States. The difference between improved land and productive land should be noted in this connection, as the terms are not wholly synonymous. Unimproved land, such as good timber land, sugar groves, etc., may be productive; while improved land, such as is occupied by the farm buildings, fences, and roads, may produce nothing.

There are other causes of nonproductivity, such as large areas of alkali, little or no rainfall, etc., but these causes affect whole regions rather than parts of individual farms and do not come within the scope of this publication.

TABLE II.—Percentage of farm land improved, by divisions and States, Census of 1910.

Division and State.	Improved land.	Division and State.	Improved land.
	<i>Per cent.</i>		<i>Per cent.</i>
UNITED STATES.....	54.4	Mountain.....	26.7
New England.....	36.8	Pacific.....	42.9
Middle Atlantic.....	67.9	The North.....	70.1
East North Central.....	75.4	The South.....	42.5
West North Central.....	70.6	The West.....	34.2
South Atlantic.....	46.7	East of the Mississippi.....	59.5
East South Central.....	53.9	West of the Mississippi.....	50.8
West South Central.....	34.4		

TABLE II.—Percentage of farm land improved, by divisions and States, census of 1910—Continued.

Division and State.	Improved land.	Division and State.	Improved land.
	<i>Per cent.</i>		<i>Per cent.</i>
New England:		South Atlantic—Continued.	
Maine.....	37.5	West Virginia.....	55.1
New Hampshire.....	23.6	North Carolina.....	39.3
Vermont.....	35.0	South Carolina.....	45.1
Massachusetts.....	40.5	Georgia.....	45.6
Rhode Island.....	40.2	Florida.....	34.4
Connecticut.....	45.2	East South Central:	
Middle Atlantic:		Kentucky.....	64.7
New York.....	67.4	Tennessee.....	54.3
New Jersey.....	70.1	Alabama.....	46.8
Pennsylvania.....	68.2	Mississippi.....	48.5
East North Central:		West South Central:	
Ohio.....	79.8	Arkansas.....	46.4
Indiana.....	79.5	Louisiana.....	50.5
Illinois.....	86.2	Oklahoma.....	60.8
Michigan.....	67.8	Texas.....	24.3
Wisconsin.....	56.5	Mountain:	
West North Central:		Montana.....	26.9
Minnesota.....	71.0	Idaho.....	52.6
Iowa.....	86.9	Wyoming.....	14.7
Missouri.....	71.1	Colorado.....	31.8
North Dakota.....	72.0	New Mexico.....	13.0
South Dakota.....	60.8	Arizona.....	28.1
Nebraska.....	63.1	Utah.....	40.3
Kansas.....	68.9	Nevada.....	27.7
South Atlantic:		Pacific:	
Delaware.....	68.7	Washington.....	54.4
Maryland.....	66.3	Oregon.....	36.6
District of Columbia.....	84.7	California.....	40.8
Virginia.....	50.6		

THE FARMSTEAD.

The group of farm buildings and adjoining lots and yards, together with the home orchard and garden, constitute what is commonly called the farmstead. Every farm must give up to this purpose more or less land. The size of this necessary area will vary with the size and type of farm, climate, and individual tastes of the owner. Some authorities advise that ample space be allowed for the farmstead, and this is doubtless good advice, provided the owner is able to afford it. It should always be remembered that, excepting the orchard and garden, every acre of land over actual necessity devoted to this purpose reduces the productivity of the farm by the net amount an acre will produce. Within certain limits, however, land well utilized for the setting of a home has a value to the farm family that can not be measured in crop yields per acre.

The two farmsteads shown by maps in fig. 1 illustrate an extended and a compact arrangement of farm buildings. These two farms do not differ greatly in area, and have about the same gross income.

The one farmstead has an "ample" layout and occupies over three acres of good land, or over 1 per cent of the total farm area. The other, under a "compact" layout, where all the necessary farm buildings except the dwelling have been brought together under one roof covering a large two-story and basement barn, uses one acre of land, or less than $\frac{1}{2}$ per cent of the total area.

It is not intended to recommend that all should pattern after the farmstead layout as shown in the right half of fig. 1. The two layouts are shown merely to bring out the two extremes. Most people would prefer something approaching a happy medium between the two.

THE FARM LANES AND ROADS.

Very few farms will be found without interior roads or lanes. These are sometimes necessary to give access to the various fields, as well as to permit the passing of animals to and from pasture, often located in the rear portion of the farm. For the latter purpose wide lanes are often used which, being kept in sod, are substantially elongations of the pasture. These wide lanes are usually uneconomic for

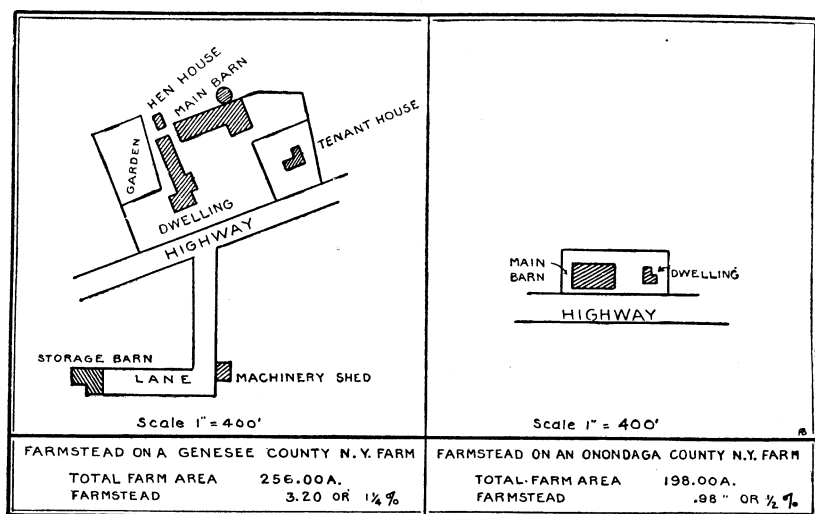


FIG. 1.—Two ordinarily undesirable extremes in farmstead arrangement.

the reason that they are customarily located on good arable land, while the areas to which they lead are often the least valuable portions of the farm, useful only as pasture.

Under certain circumstances farm lanes are unavoidable, but often a little thought and a slight rearrangement of the farm organization plan will eliminate them. Fig. 2 shows two maps of the same farm in Monroe County, N. Y., before and after the only farm lane was dispensed with. In this case the reorganization was effected by the simple expedient of staking out the two cows upon which the family depended for its milk supply. The new arrangement is found considerably more efficient than the old, as a large part of the area formerly occupied by the lane now produces crops, and two uneconomic fence lines, entailing an annual upkeep expense, have been eliminated. (See also fig. 9.)

THE PUBLIC HIGHWAY.

Not infrequently a part of the area of the public highway touching the farm is included in the total farm area. This is a fixed practice in certain regions. Sometimes under exceptional circumstances it is possible to raise crops on the greater part of the public highway area by tilling the strip between the actual roadway and the right-of-way line, or it may be seeded to grass and pastured. (See figs. 3 and 4.) In determining the value of a farm, consideration should be taken of the area of highways included in the acreage, so that the farm can be judged by its actual available area and not by that called for by the deed measurements.

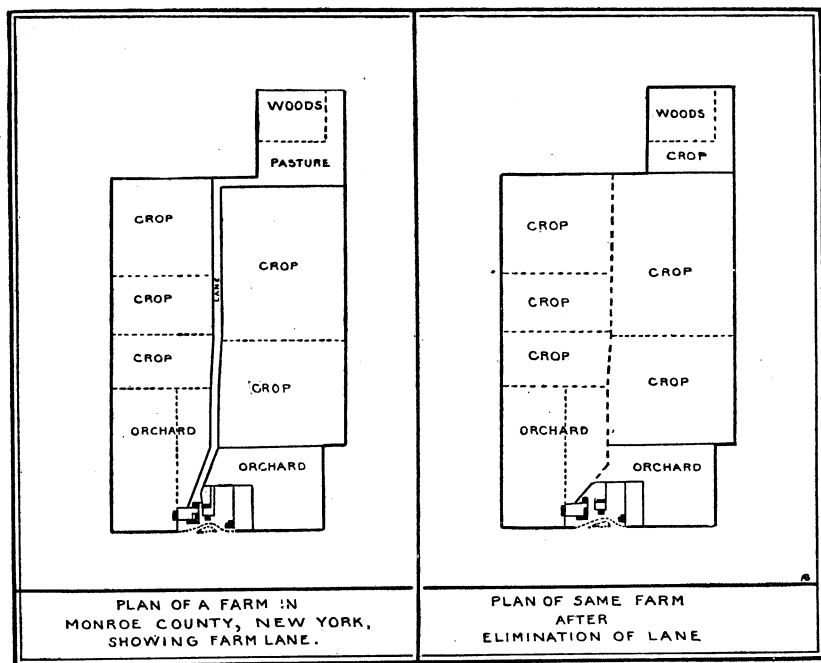


FIG. 2.—Comparison of farm arrangement before and after elimination of a central lane by discontinuing back pasture.

UNTILLABLE AREAS.

Many areas found on farms are permanently untillable by reason of the presence of rocky ledges, steep slopes, deep ravines, wide stream areas, or undrainable swamps. (See fig. 5.) Permanently untillable areas can be made productive by pasturage if they will grow enough grass to make it economy to pasture them, or they can sometimes be given over to the production of timber.¹

Other areas, broken by stumps, brush, large boulders, gullies, swales, etc., which it is possible to reclaim by a resort to the proper

¹ See bulletin 295, Cornell experiment station, N. Y., pp. 464-473.

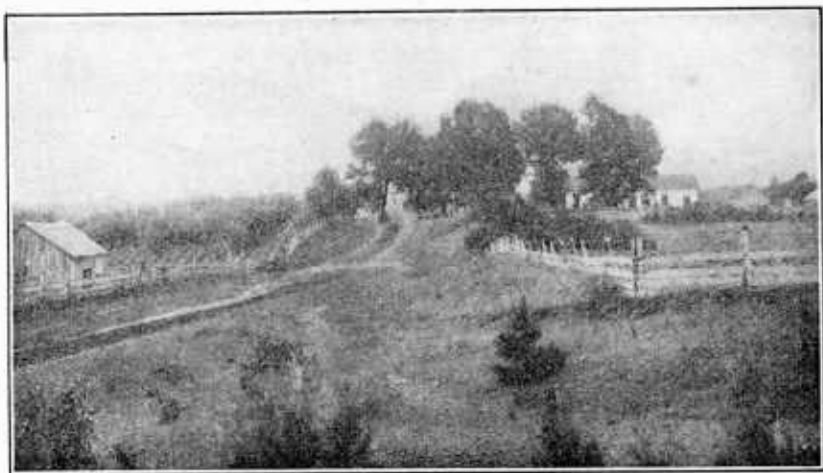


FIG. 3.—Land wasted by the wayside. By cultivating to the actual right-of-way line several acres of nonproductive land might be reclaimed.

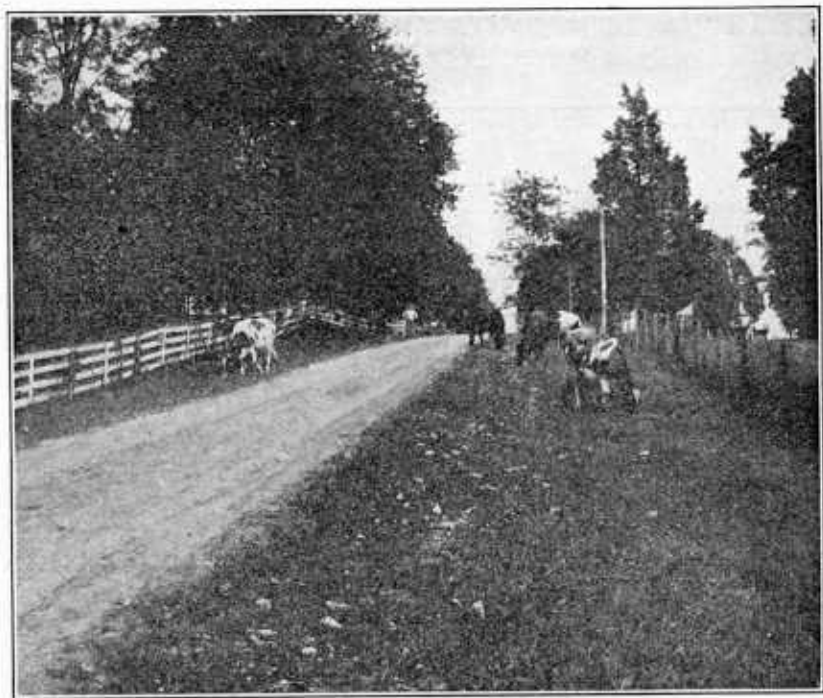


FIG. 4.—Getting the most out of the part of the farm included in the highway. One way of making it partly productive agriculturally.



FIG. 5.—A steep, rocky slope, untillable and not economically pasturable. The more acres of this kind on a farm the harder it is to make a profit.



FIG. 6.—A comparatively small stream sometimes cuts out a wide strip of land from the productive area of a farm. Here a straight ditch would increase the field area and facilitate field operations.

methods of reclamation,¹ often remain untillable because of lack of means, skill, or equipment necessary to put them in suitable shape, and sometimes because owners believe that it would not be worth while to try to clear them. (See Figs. 6, 7, and 8.) In handling such an area the probable cost of bringing it under the plow should be carefully compared with the market value of good arable land in the neighborhood. In this way can be ascertained whether or not reclamation would be profitable.

WOODLAND.

Woodland is ordinarily productive land, but often farm wood lots producing only firewood for home consumption are maintained under uneconomic conditions. The more valuable the land, the more likely this is to be the case. Where timber occupies high-priced land which would be tillable if cleared, it is often questionable whether it is economic to allow it to remain. The cost of clearing, salable value of timber products, interest on the investment, prospective increased farm value of the land when cleared, and added annual expense for firewood must be weighed carefully before a decision can be reached in any such case.

FENCE ROWS.

Where field fences exist they ordinarily occupy land that would otherwise be utilized for productive purposes, and unless they are indispensable to the business of the farm they often may be eliminated with profit and the land they occupy made available for productive purposes. In the aggregate a large area of tillable land is taken up by fences, but until recently very little attention has been given by agricultural writers to the economic aspect of this subject. Bulletin 321 of the United States Department of Agriculture² deals fully with the economy of fences. (See figs. 9 and 10.)

It will be seen by the table below that some types of fence occupy much more land than others. On a number of farms in central Illinois, in a region where the land is tilled as close as possible to the fences, careful measurements taken give the following figures:

Kind of fence.	Average width of strip of land occupied.		Number of rods of fence occupying 1 acre.
	<i>Ft.</i>	<i>In.</i>	
Barbed wire.....	5	7	473
Woven wire.....	5	9½	459
Trimmed hedge.....	6	10½	384
Board.....	7	6	352
Zigzag rail ("worm").....	12	4	214
Untrimmed hedge.....	12	8	209

¹ See reference list of publications on draining and clearing farm land at end of bulletin.

² Cost of fencing farms in the North Central States, by H. N. Humphrey. Dep. Bul. 321.

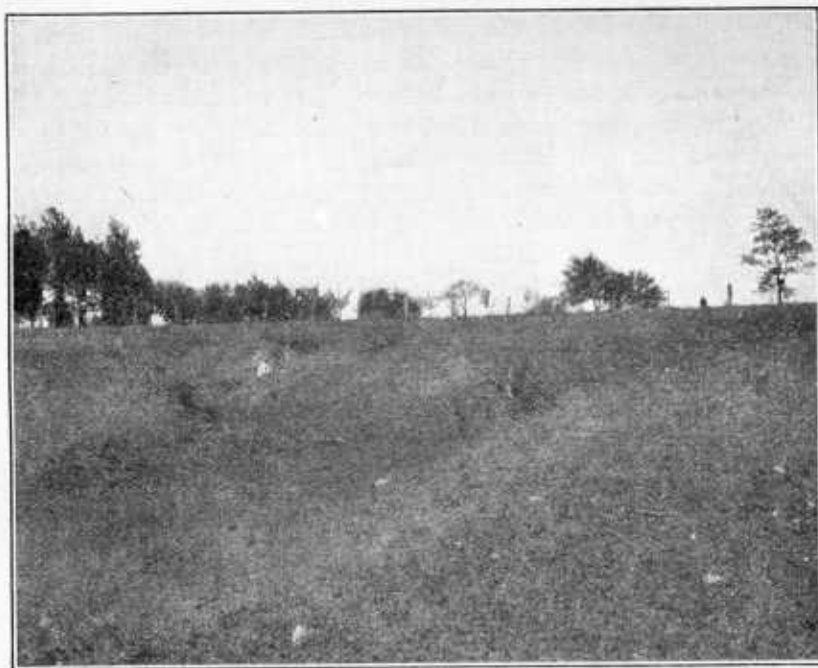


FIG. 7.—One of the results of bad tillage methods. A badly gullied field, best utilized for pasture. A little attention when this wash began would have stopped it. A place for a brush dam.

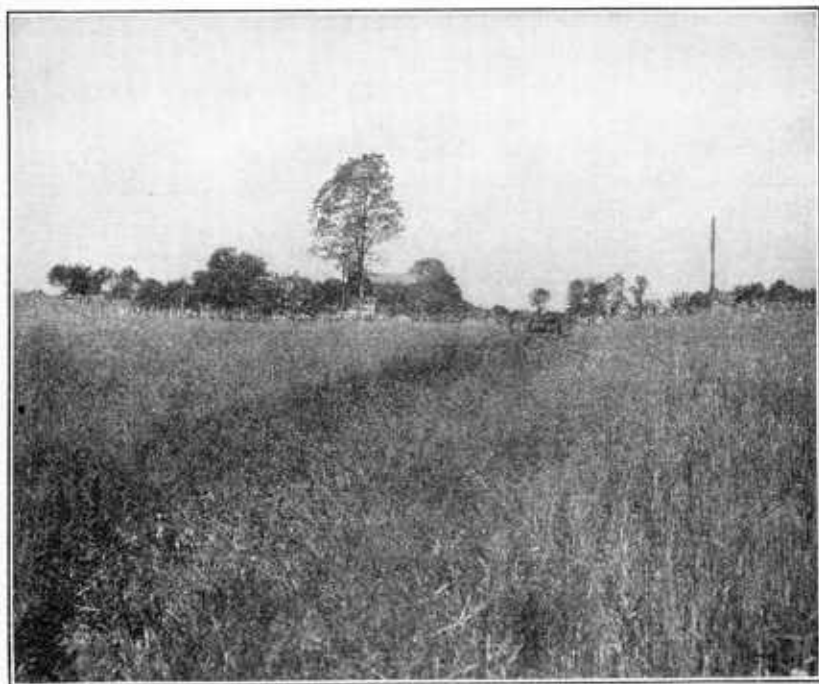


FIG. 8.—A stream, heading at a spring near the barn in the background, makes waste a wide strip through this fertile field. Drain tile needed here.

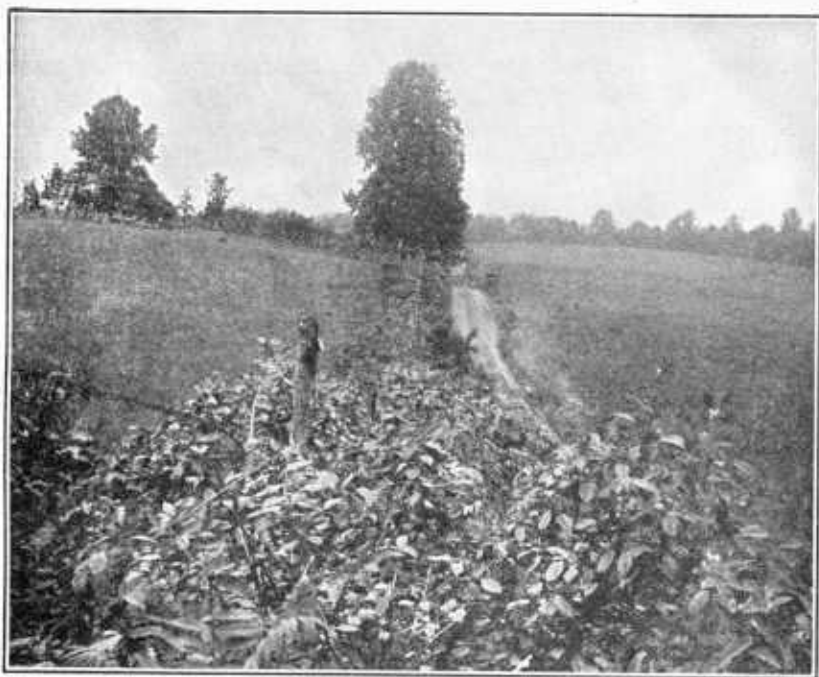


FIG. 9.—A volunteer hedge which should be eliminated. A fence-row overgrown with brush, bordering a farmland. The two take out of the productive area of this farm a strip of land 50 feet wide and three-fourths mile long.



FIG. 10.—Waste of land entailed by a fence between two tilled fields under average farm conditions. The fence-row is 7 feet wide.

It will be seen that there is a wide variation in the width of the strip occupied by various styles of fence. Untrimmed hedges are much more wasteful of land than the table shows, as it is found that crops are injured by the hedge roots as far out as 20 feet on each side in some instances. Zigzag rail and stone fences also have an additional disadvantage, as they harbor weeds, rodents, insects, and other enemies of efficient farming.

HEADLANDS AND TERRACES.

The practice of leaving headlands or turning spaces at the edges of fields is a wasteful one, widely followed in some of the newer agricultural regions. The land thus taken up produces nothing and is practically wasted. The old-fashioned terraces common in the cotton belt are uneconomic in that they occupy tillable land and harbor weeds. By many they are considered necessary to the cotton-belt types of soil and agriculture; but a large number of farms exist in which they have been entirely eliminated. Where they are actually necessary it would seem that the tilled or "Mangum"¹ terrace is far more to be desired than the ordinary weed-covered, pest-propagating kind.

UNECONOMIC PASTURE LAND.

In many cases land is given over to use as pasture which will not support sufficient stock to make any reasonable return on the investment. (See fig. 5.) Such land properly belongs in the category of nonproductive land, in that it makes no return commensurate with the interest on the money invested.

It should be borne in mind that the quality of the pasturage in relation to the land value is an important consideration in choosing a farm. For instance, what is economic pasture on land that is worth \$10 per acre might, on land valued at \$100 an acre, be decidedly uneconomic. This relation should be carefully studied in buying a farm with much pasture land. To determine whether pasture land is economic or not, practical data should be secured as to the number of acres necessary to support one head of stock and the interest on the value of the land in question compared with the current charge per head of the same kind of stock for a season's pasturage. Or the estimated value of the return in increased value of the stock or its products may be used for comparison. By this means the relative economy of pastures may be determined.

A STUDY OF LAND UTILIZATION ON 1,703 FARMS.

During the past half-dozen years the Office of Farm Management has cooperated with farmers in several of the States in the keeping of cost records. In each case an accurate map was made of the farm of the cooperator for determining the exact division and distribution of the land composing the farm. Table III shows the average proportion of the land utilized by crops, farmstead, roads, pasture, wood-

¹ See "The Mangum Terrace," by J. S. Cates, B. P. I. Cir. 94.

land, and waste lands on 99 of these farms in five States along our northern boundary. Farmers in seven other States were cooperated with, but in no one of these States was there a sufficient number to give a significant average.

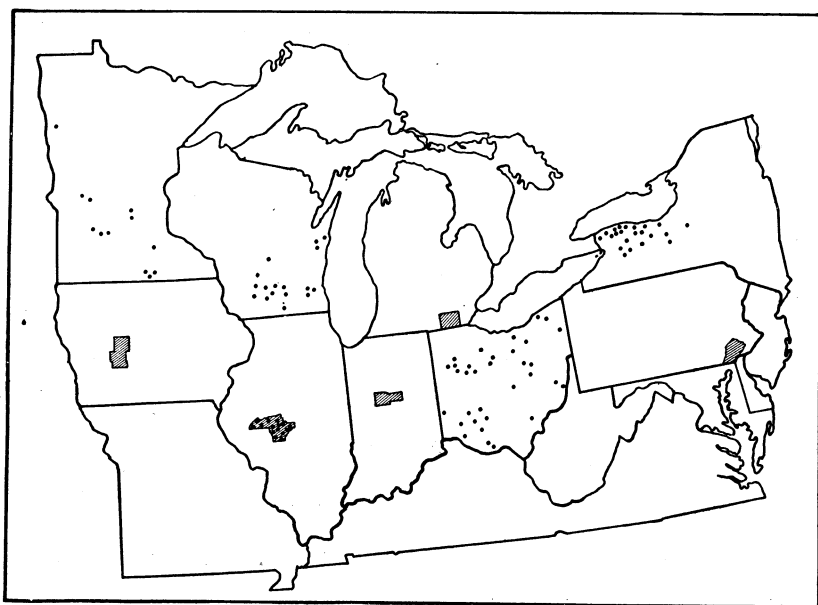


FIG. 11.—Location of 99 individual farms and 5 agricultural sections from which data were secured. Each dot represents a farm actually measured and each shaded area a locality where the survey method was used.

TABLE III.—*Utilization of land on 99 farms in five States.*

(From actual land measurements.)

Use of land.	Average number of acres per farm.					Relation to total area.				
	Western New York.	Ohio.	Central Illinois.	Southern Wisconsin.	Minnesota.	Western New York.	Ohio.	Central Illinois.	Southern Wisconsin.	Minnesota.
Total acreage..	131.55	193.29	191.00	170.04	263.10	<i>Per ct.</i> 100.0	<i>Per ct.</i> 100.0	<i>Per ct.</i> 100.0	<i>Per ct.</i> 100.0	<i>Per ct.</i> 100.0
Productive, total....	124.58	183.01	182.70	154.15	236.57	94.7	94.7	95.6	90.7	89.9
Tillable.....	107.77	109.40	156.70	86.86	188.60	81.9	56.6	82.0	51.1	71.7
In crops.....	105.32	101.89	148.68	82.88	183.54	80.0	52.7	77.8	48.8	69.8
Tillable pasture, fallow, etc....	2.45	7.51	8.02	3.98	5.06	1.9	3.9	4.2	2.3	1.9
Woods.....	9.68	33.73	2.38	29.93	11.87	7.4	17.5	1.2	17.6	4.5
Permanent pasture.....	7.13	39.88	23.62	37.36	36.10	5.4	20.6	12.4	22.0	13.7
Nonproductive, total	6.97	10.28	8.30	15.89	26.53	5.3	5.3	4.4	9.3	10.1
Farmstead.....	2.30	3.21	3.91	4.13	7.97	1.8	1.6	2.1	2.4	3.0
Roads.....	3.21	3.03	2.94	4.51	5.17	2.4	1.6	1.5	2.6	2.0
Waste land.....	1.46	4.04	1.45	7.25	13.39	1.1	2.1	0.8	4.3	5.1
Number of farms....	22	33	15	17	12	22	33	15	17	12

Additional land-utilization data for farms in five States, from one of which data were secured by the cost-accounting method, are available from farm-management surveys. These data are shown in Table IV. Fig. 11 shows the location of the farms represented

in Tables III and IV, each dot on the map representing one farm where actual measurements were made, and the shaded areas the localities from which data were secured by the survey method. These latter data were gathered by the customary Farm-Management survey method of recording the farmers' answers to carefully prepared interrogations. That this method secured fairly accurate land-utilization data becomes evident upon comparing the Illinois percentage figures in Table IV with those in Table III. It is probable that the averages in Table IV are more accurate than those in Table III, since the number of farms involved is 12 times as large. In Table IV the farmsteads, roads, and waste lands are grouped as one item. The chart shown in fig. 12 exhibits the percentages given in Tables III and IV in graphic form.

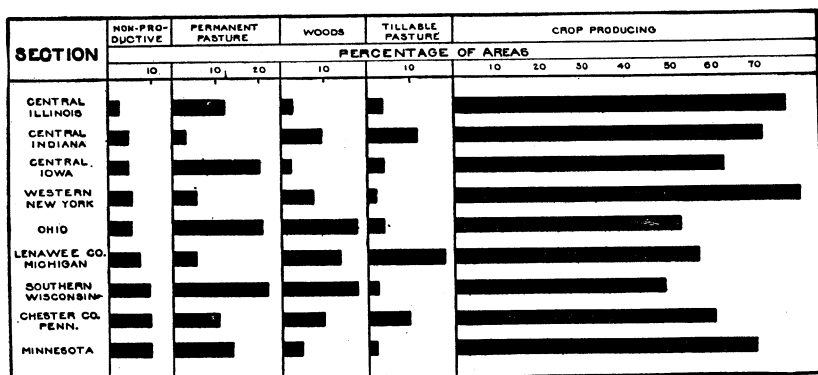


FIG. 12.—Chart showing average percentage of land on farms devoted to different uses in nine regions of the United States.

TABLE IV.—Utilization of land on 1,604 farms in five States.

(From data collected in Farm Management surveys.)

Use of land.	Average number of acres per farm.					Relation to total area.				
	Chester County, Pa.	Lenawee County, Mich.	Central Indiana.	Central Illinois.	Central Iowa.	Chester County, Pa.	Lenawee County, Mich.	Central Indiana.	Central Illinois.	Central Iowa.
Total acreage..	93.62	111.98	113.70	240.57	183.02	Per ct. 100.0	Per ct. 100.0	Per ct. 100.0	Per ct. 100.0	Per ct. 100.0
Productive (total)...	84.78	104.18	108.58	235.25	174.80	90.5	93.0	95.5	97.8	95.5
Tillable.....	65.48	83.03	94.57	198.80	133.82	69.9	74.1	83.2	82.6	73.1
In crops.....	56.36	63.07	81.31	187.00	126.72	60.2	56.3	71.5	77.7	69.2
Tillable pasture, fallow, etc....	9.12	19.96	13.26	11.80	7.10	9.7	17.8	11.7	4.9	3.9
Woods.....	9.29	14.97	10.63	7.02	4.14	9.9	13.4	9.3	2.9	2.3
Permanent pasture.....	10.01	6.18	3.38	29.43	36.84	10.7	5.5	3.0	12.3	20.1
Nonproductive (farmstead, roads, and waste land)...	8.84	7.80	5.12	5.32	8.22	9.5	7.0	4.5	2.2	4.5
Number of farms....	502	453	262	180	207	502	453	262	180	207

There is considerable variation in the way the land is utilized in the different regions studied, as shown in Tables III and IV. This is due to the varying types of agriculture, the diversity of natural conditions, the price of land, and the length of time that agriculture has been practiced in each region. Where the land is practically level, mostly free from timber, and well drained, a large proportion of it is naturally in crops. Where the country is hilly, more woods and permanent pastures are found, as these are the most profitable uses to which much of the land can be put. In the newer agricultural regions there are comparatively large areas of nonproductive land, as the land is cheap and therefore there has not been the same necessity to bring every available acre under the plow as in the older areas where land is high priced.

These data on utilization of land, when examined in relation to the types of agriculture prevailing in the regions studied, show that in general the business of farming is almost invariably adapted to existing conditions. Economic pressure is a force that must be reckoned with, and as a rule, any attempt to go against its laws will necessarily result in failure. Therefore the majority of farmers in any region fall naturally into a type of farming economically suited to that region.

INFLUENCE OF LAND TENURE.

There are three well-defined general systems of tenure of farm land:

1. Where all the land is owned by the operator.
2. Where all the land is rented by the operator.
3. Where part is owned and part rented.

Table V shows how the land is utilized on the farms studied in the corn-belt States of Indiana, Illinois, and Iowa under these three different systems of tenure. This table shows that, on the farms studied, the man owning one place and renting additional acres makes a better utilization of his land than either a tenant or owner, while both the tenants and the part owners are more efficient in this respect than the owners.

The economic reasons for this showing are not difficult to find. While owners operating average-sized farms get along without efficient utilization of their farm land by reason of having no rent to pay (in other words, by living partly on the interest on their investment), the tenant or small-farm owner renting additional land must so utilize the leased land he farms as to pay the rent and leave a remainder sufficient for his own expenses.

TABLE V.—*Variation in land utilization under different systems of tenure on 649 farms in three corn-belt States.*

(In terms of percentage of average farm area.)

State and system of tenure.	Number of farms.	Proportion of land devoted to each use.			
		Cropped.	Tillable.	Productive.	Nonproductive.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Indiana:					
Owners.....	123	69.0	81.1	94.7	5.3
Tenants.....	83	72.3	83.3	96.0	4.0
Owners renting.....	56	75.3	87.2	96.4	3.6
Illinois:					
Owners.....	73	70.2	76.0	97.6	2.4
Tenants.....	71	83.8	87.7	97.8	2.2
Owners renting.....	36	82.6	87.3	98.2	1.8
Iowa:					
Owners.....	77	63.3	69.5	95.2	4.8
Tenants.....	93	71.0	72.5	95.5	4.5
Owners renting.....	37	76.3	81.6	96.1	3.9
Average for three States:					
Owners.....	273	67.8	75.5	96.0	4.0
Tenants.....	247	75.7	80.4	96.4	3.6
Owners renting.....	129	78.8	85.7	97.1	2.9

The tenant can not make as efficient utilization of land as the small owner renting additional land, since the tenant rents an entire farm and must usually take it as it is, productive and unproductive, tillable and untillable, and pay a rental sufficient to compensate the owner for his total investment, while the owner of a small place will naturally choose only tillable land in renting additional acres. Furthermore, the tenant can not afford to clear rough land, drain wet spots, etc., on a leased farm, while the small owner profitably can and usually does get every possible foot of his small holding on a productive basis. Using the average percentage of unproductive land on part-owner farms as a base, tenants had 24 per cent and owners 37½ per cent higher percentage of such land than part owners.

LOCAL VARIATION IN LAND UTILIZATION.

From the data shown and the foregoing discussion it will be seen that the utilization of land is largely governed by existing conditions, natural and economic, and that the average farmer in a given region will eventually of necessity follow a system in accordance with the conditions there. It must not be overlooked, however, that the personal element enters into the equation, and that both efficient utilization of land and the reverse may and do exist on farms of the same general type in the same region.

Table VI shows the variation in efficiency in land utilization on the most and the least efficient farm in this respect in each of the five regions covered in Table III. These data indicate the possibilities of good judgment in land utilization. In each section the most efficient farm has less than half the average percentage of land nonpro-

ductive, while the least efficient farm has more than double the average percentage nonproductive. While these variations are doubtless due in part to natural conditions, such as waste lands which it is impracticable to reclaim, they nevertheless indicate that there is need of good judgment in studying farms from the standpoint of efficient land utilization.

TABLE VI.—*Variation in efficiency of land utilization on individual farms in five States.*

[In terms of percentage of total farm area.]

Region.	Proportion of nonproductive land on—		
	Farm having least efficient land utilization.	Average of the region.	Farm having most efficient land utilization.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Western New York	12.7	5.3	2.6
Ohio	13.6	5.3	1.6
Central Illinois	9.0	4.4	1.8
Southern Wisconsin	18.1	9.0	2.5
Minnesota	22.4	10.1	4.3

CONCLUSION.

The results of this study, based on area records from 1,703 farms distributed throughout nine States, serve to call attention to the fact that there are certain portions of any farm which contribute nothing to the farm income, and to suggest various ways through which more or less of such nonproductive land may be reclaimed on the average farm. The percentage of the total farm acreage occupied by these nonproductive areas varies widely in different regions, and even on different individual farms in the same locality; yet even at best, where farming has been developed to a high state of efficiency, it is not uncommon to see land wasted by inefficient farm organization.

Every nonproducing acre of tillable land that profitably can be made productive is a loafer acre and should either be put to work or sold. Otherwise the money tied up in it is dead capital. The size of the productive part of a farm is perhaps the most important factor bearing upon the solution of the problem of successful farming under average conditions, and every loafer acre reclaimed is that much added to the farmer's chance of making a good income.

**PUBLICATIONS OF THE UNITED STATES DEPARTMENT OF AGRICULTURE
AND OF EXPERIMENT STATIONS OF INTEREST IN CONNECTION WITH
THIS BULLETIN.**

ON CLEARING LAND.

DEPARTMENT PUBLICATIONS.

- Bur. Plant Indus. Cir. 25, The cost of clearing logged-off land for farming in the Pacific Northwest.
Bur. Plant Indus. Bul. 239, Cost and methods of clearing land in western Washington.
Dept. Bul. 91, Cost and methods of clearing land in the Lake States.
Farmers' Bul. 600, An outfit for boring taprooted stumps for blasting.

STATION PUBLICATIONS.

- Kentucky Sta. Bul. 154, Blowing stumps with dynamite.
Minnesota Sta. Bul. 134, Land clearing.
Mississippi Sta. Bul. 159, Clearing pine land.
Washington Sta. Bul. 93, I. A preliminary report on some experiments in clearing logged-off land with a stump burner.
Washington Sta. Bul. 93, II. A promising method for destroying stumps and logs.
Washington Sta. Bul. 101, Methods of clearing logged-off lands.
Washington Sta. Pop. Bul. 40, Char-pit method of destroying stumps.
Washington Sta. Bul. 1, Spec. Ser., An experiment in clearing logged-off land by the aid of a donkey engine in 1908.

ON DRAINAGE.

DEPARTMENT PUBLICATIONS.

- Farmers' Bul. 187, Drainage on farm lands.
Farmers' Bul. 524, Tile drainage on the farm.

STATION PUBLICATIONS.

- Arkansas Sta. Bul. 32, Farm drainage.
Arkansas Sta. Bul. 104, Farm drainage.
Delaware Sta. Rpt., 1892 (p. 30, 31), Soil improvement caused by vertical drainage.
Indiana Sta. Bul. 57 (p. 81-100), The improvement of unproductive black soils.
Iowa Sta. Bul. 78 (p. 235-263), Drainage conditions in Iowa. Notes and tables on drainage engineering.
Michigan Sta. Spec. Bul. 56 (p. 467-510), Drainage.
Minnesota Sta. Bul. 110, Report on the installation of an experimental drainage system.
New Hampshire Sta. Bul. 118, Tile drainage.
New York Cornell Sta. Bul. 254 (p. 229-282, figs. 188-216), Drainage in New York.
Ohio Sta. Cir. 147, The cost of tile drainage.
Utah Sta. Bul. 123, Farm drainage, a manual of instruction.
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Wisconsin Sta. Bul. 229, The right drain for the right place.
Wisconsin Sta. Rpt. 12th, 1895 (p. 232-236), An experiment in draining low-lying marsh lands by means of a dike, a sump or reservoir, tile drains, and a windmill.